THE UNIVERSITY OF WASHINGTON

Arboretum *bulletin*

FALL
1961

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Arboretum bulletin

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The Arboretum Bulletin

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To keep memberships in the Arboretum Foundation in good standing, dues should be paid during the month payable. Active memberships more than three months in arrears will be dropped and THE BULLETIN will be discontinued.

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A Letter from the President

TO MEMBERS OF THE
ARBORETUM FOUNDATION

As our fiscal year draws to a close, a review of the Arboretum committee work may be of interest. Membership in the Foundation has remained at about 2650, with new members replacing the usual resignations. Many members have up-graded their memberships, which has been helpful to our finances.

The Garden Tour boat trip on Lake Washington was a happy afternoon spent by some 390 members and guests (in the comfort of private boats furnished by friends of the Arboretum) cruising near the shore where they could observe the lovely gardens of the shore homes.

The Japanese Tea Garden entered its maintenance phase during the year. The large number of plantings requiring constant care has meant a heavy cost. It is hoped that the 2500 weekly visitors will pay the maintenance charges.

Studies are presently being made for a Floral Hall, which Foundation members are eager to have constructed in the not too distant future. There are many problems in connection with such a structure that must be solved before it can be assured. A committee has been appointed by the president of the University to work out the details.

The Education Department of the Arboretum has had a very successful year. Registration for all classes has exceeded the maximum capacity. This is one of the important activities of the Arboretum Foundation.

The Unit Council stands high in the Foundation, and during the year has been most active. Their 1960 Fall Plant sale was most successful and the Units are hoping to do as well this October.

All the above activities have been carried out by the Committees of the Foundation. Other committees which deserve commendation are the City Liaison, Meeting Arrangements, and Ways and Means.

I wish at this time to express my deep appreciation to each of the members.

WILLIAM D. SHANNON, *President*

Arboreta and Gardens of N.W. Europe; Part 3

B. O. Mulligan

FROM Belfast, N. Ireland, I went by train a hundred miles south to the "fair city," Dublin, where I spent a most enjoyable and profitable week early in August, commencing with a visit to the oldest inhabited Irish castle, Malahide, close to the coast on the northern outskirts of the city, belonging to Baron Talbot de Malahide, whose family has held this estate for more than 750 years; he was kind enough to escort me round the garden, following a belated arrival for lunch, and supply details and data which add so much to any garden visit.

This, which has evidently been passing through a period of rejuvenation and new planting during the last few years, contains a selection of good and often unusual trees and shrubs. *Olearia* and *Callistemon* species, evergreen shrubs from Australia and New Zealand, were doing well on the somewhat alkaline soil; a young tree of the elegant Mexican *Cupressus lusitanica* (var. *Benthamii*) was already bearing cones. Within the walled garden grew a variety of plants appreciating such shelter; an old plant of the California Bush Poppy, *Dendromecon rigida,* with grey, Eucalyptus-like foliage, an immense clump of *Acanthus,* with handsome inflorescences towering over the glossy foliage, the shrubby *Coronilla glauca* and its rare variegated form, and many more.

This garden very clearly represents the personal tastes and fancies of the owner and in a few years time the ancient building will be surrounded by an entirely new collection and arrangement of trees and shrubs which will certainly provide much interest through a large part of the year.

Next day I revisited, after an interval of almost exactly thirty years, the house and garden of Mount Usher, at Ashford, Co. Wicklow, some 25 miles south of Dublin and three miles from the coast. This is the property of Mr. E. H. Walpole, who has continued to watch over its development and improvement for more than forty years, although its beginnings go back to the 1860s, as attested by a big redwood tree growing close to the front door of the house.

This is one of the most remarkable places visited during my entire tour, not only for the extraordinary variety of trees and shrubs cultivated but also for their size, vigor and general health. This is no doubt due to the mild climate as well as the constant supply of moisture from the river Vartry, which runs through this sheltered valley (fig.?).

Unquestionably the most remarkable group of trees is the eucalyptus, of which several species have attained 120 ft. or more, towering above other surrounding trees; they have been the subject of studies by different investigators of their identities, growth rates and hardiness, especially Dr. D. Martin of Tasmania. In general, trees and shrubs of the southern hemisphere have been unusually successful here, so that large examples of such genera as *Pittosporum, Nothofagus, Drimys, Myrtus, Eucryphia,* and the conifers *Athrotaxis, Fitzroya* and *Podocarpus* can be seen. At the time of my visit magnificent plants 25-30 ft. tall of *Eucryphia glutinosa,* from Chile, flowering profusely along each side of a broad grass walk, were the finest sight in the garden, carpeting the ground with fallen blossoms.

A beautiful and handsome conifer is *Pinus Montezumae,* native to Mexico, here 50 ft. high after fifty years growth, with a smaller daughter tree elsewhere. Close to the house is an old and remarkable group consisting of a mature specimen each of *Cordyline australis* from New Zealand, *Acer palmatum,*—the red-twigged clone 'Sangokaku' from Japan,—and *Eucryphia cordifolia* from Chile, a most unusual assemblage in any garden, well illustrating the quality and variety of woody

plants to be found at Mount Usher.

One could devote many pages to descriptions of this place and its great assortment of plants of all kinds, for excellent herbaceous plants and ferns grow there also, but with an expression of deep appreciation to Mr. Walpole and his family for their great kindness and hospitality that day I must pass on to other gardens.

One which I had for many years hoped but so far failed to see was Headfort, an estate some 40 miles NNW of Dublin, where in the years between the two world wars the 4th Marquess of Headfort, who died in 1943, had gathered together an exceptional collection of trees and shrubs, especially conifers, many of them raised directly from seeds sent back from S.W. China by the plant collector George Forrest, whose work and journeys he helped to support for many seasons. This time I was fortunate; my good friend of many years standing, Lady Moore, of Rathfarnham, near Dublin, drove me out to Headfort, where we were able to spend several hours walking about examining plants of all kinds, very few with labels, and trying to identify as many of the unknowns as we could. The house is now leased to a boys school and we saw no one, apparently having the place to ourselves that Sunday.

Out in the grass on the north side of the long grey stone house were two specimen conifers of particular note; one was probably *Abies Forrestii* (or a near relative) from W. China, bearing its purple cones; the other *Picea Breweriana,* the Siskiyou spruce, over 40 ft. tall and also coning, one of the finest cultivated specimens I have ever seen, though it was growing well at Mt. Usher and in other places visited later.

In the neglected walled garden were other conifers of both rarity and beauty; several species of *Athrotaxis,* from Tasmania; *Juniperus Coxii* (or *J. recurva* var. *Coxii),* the "coffin juniper" from Upper Burma; a superb *Cupressus cashmeriana,* one of the most beautiful of all conifers, with pendulous branches and grey foliage, and the almost fabulous *Taiwania,* native of Formosa and N. Burma, a relative of both *Cryptomeria* and *Cunninghamia,* about 18 ft. tall and in excellent health. I also noticed a vigorous young maple tree pushing its way up amongst other shrubs, the leaves unusually large, shaped much like the sycamore maple *(Acer pseudoplatanus)* of Europe, but distinctly glaucous beneath. This was most probably *Acer Giraldii* Pax, native of W. China and S.E. Tibet, which I was to see again later in Cornwall, England, as a much larger tree. Many more unusual and exciting trees are growing here with little attention and one could easily spend much time, if it was available, examining and recording their size and characters.

On the south side of the house, which is terraced with broad grass walks, the ground slopes gradually down to the Blackwater river. Crossing a wooden bridge, we are on the Great Island, where two large trees of *Abies Forrestii* were prominent, as well as an assortment of Berberis species close to the path, the majority probably of Chinese origin, and various other conifers and deciduous trees, all growing vigorously in the moist soil.

Turning left over a smaller bridge on to Little Island, by several immense old plants of *Magnolia Wilsonii,* we find a collection of fine mature spruce trees, seldom labelled but evidently again from W. China, and including *Picea asperata* and *P. likiangensis,* besides several very uncommon junipers, the elegant *Cupressus torulosa* from the Himalaya and W. China, and the rare Yunnan hemlock, *Tsuga yunnanensis,* which we have difficulty in growing in Seattle.

Near the house is an extensive collection of rhododendrons, both large and small, the latter perhaps especially varied and interesting, but August is not the best month in which to appreciate these and we were running short of time so had to pass them rather hastily. In the spring one would certainly linger here.

For those who want to learn more of Headfort and its plants I recommend the detailed article by Mr. R. C. Jenkinson, in the *Journal of the Royal Horticultural Society* (London), vol. 84, pt. 8 (Aug. 1959), an accomplished

writer much better acquainted with the history and horticultural treasures of this unique garden than I am.

The National Botanic Garden at Glasnevin, in the northwestern part of Dublin, is the equivalent of Kew to London, and almost as old (founded in 1790, compared with 1759 for the latter), but very much smaller in area, being limited to some 53 acres instead of about 300 acres. It also possesses a small closely confined river where species of willows grow along the banks, and a useful pool for water-loving plants.

Unfortunately the Director, Dr. T. J. Walsh, was in hospital at the time of my visit, but I was well cared for by his assistants, Mr. J. P. Fanning and Mr. E. James, who between them showed me all the important features and many of the varied and often old and very unusual plants to be found there.

Whilst somewhat handicapped by the alkaline reaction of the soil, which more or less eliminates most of the *Ericaceae* and certain genera which flourish in acid soils, except when grown in specially prepared beds, there are many others which are entirely satisfactory and very successful, such as the Cotoneasters and members of the *Rosaceae* generally, the crab apples, pears and cherries, with a large selection of maples, where I found several rarely seen in cultivation *(Acer ambiguum, A. tenellum,* and *A. Veitchii),* a good collection of firs *(Abies)* and spruces, of which *Abies chensiensis,* raised from G. Forrest's seeds from S.W. China in 1930, nearly 30 ft. tall and coning, the western Himalayan *A. Pindrow* var. *brevifolia,* about 40 ft., and the western Chinese *Picea likiangensis* (40 ft.), no doubt also from Forrest's seeds, were notable.

Possibly the most remarkable tree in this garden is a superb pendulous form of *Cedrus atlantica* 'Glauca', about 80 years old, 25 ft. tall and probably 35 feet across,—a very beautiful specimen for a lawn, as it is grown there.

At the time of my visit the long, curved herbaceous borders, on either side of a paved path, were in full bloom and formed a most outstanding display for visitors to enjoy. There is likewise an extensive rock garden, on and around which are to be found some exceptional specimens of dwarf types of conifers, which regrettably I did not have the time to study as they deserved.

Around the frame yard, where young plants are grown on in pots and beds for replenishing the rock garden and other sections, is a high wall covered with carefully trained shrubs and climbing plants appreciating such protection; for examples, the Himalayan *Buddleia Colvilei,* with tassels of rose red flowers, largest in its race; *Holboellia coriacea,* an evergreen climber from W. China originally introduced by E. H. Wilson, and an attractive shrubby member of the pea family, *Desmodium oxyphyllum,* producing panicles of pink flowers in August. Thanks to the kindness of Dr. Walsh in sending us seeds later, I am glad to say that we have some

(Continued on Page 92)

Below:

Reflections in the River Vartry, Mount Usher, County Wicklow, Ireland

FIG. 9 PHOTO BY: B. O. MULLIGAN

Fall Color in the Arboretum

J. A. Witt

ALTHOUGH the Pacific Northwest is endowed with more than its share of scenic beauty a brilliant display of fall color can't truthfully be included. True, the vine maple, western larch, aspen and huckleberry do lighten the somber tones of the autumn, but most of these are found in the mountain areas away from the lowlands and even then rarely can one find the glowing colors that mark a New England or Great Smoky Mountains fall.

The Arboretum has been making a determined effort to introduce into its collections plants that will fill this gap in our region's floral display, often choosing a particular individual plant from among several seedlings because of its good color. If one may judge by the increasingly beautiful display each October and November, this program has been quite successful.

There are several areas in the Arboretum and many groups of plants that are outstanding for fall color and we can select only a few of these to draw your attention to.

Without doubt Woodland Garden is the main stage for autumn color, and indeed it was planned to be so. Beginning with certain of the Japanese maples in early October one group vies with another for nearly a month in trying to display the most brightly colored foliage. The Japanese maples deserve special mention since Woodland Garden is their main home here. These little trees were imported from Japan in 1940 and 1941 and are largely cultivars or garden varieties of *Acer palmatum*. They range in height from two feet as in *Acer palmatum* var. *dissectum* 'Ornatum' to the nearly fifteen feet tall 'Matsukaze.' The leaf shape is as various as the habit and the autumnal coloring as the leaves. Several clones change to yellow, others such as 'Aocha-nishiki,' growing at the east end of the upper pond, develop a fiery orange as their leaves die. The major part of the Japanese maples is on the north bank of Woodland Garden but the star is more or less by itself on the south bank near the east end. This is 'Harusame,' a bushy treee that rises above an undergrowth of Oregon grape and rivals the nearby sourwoods in its brilliant scarlet foliage.

The sourwoods, *Oxydendrum arboreum,* are probably the most reliable plants for autumn color that we grow, and the most spectacular group is in the southeast section of Woodland Garden, although there are others scattered throughout the Arboretum. The former start coloring early in October and by midmonth nothing can compare with them for brilliant red hues. The largest trees, about twenty feet tall, are now nearly twenty years old, with an erect habit made doubly attractive by the contrast of the highly colored foliage and the light gray seed capsules held at the tips of the branches.

The witchhazels, *Hamamelis,* and their relatives are famous for their autumnal tints and the members of the family in Woodland Garden add to that reputation. The sweetgum, *Liquidambar styraciflua,* is represented here by several small trees; the most colorful ones are at the east end of both the upper and lower ponds. Their neat star-shaped leaves take on a hue unlike any other of our trees; yellows, reds, and purples in striking combinations. One of the finest sights in the Arboretum is the western tree reflected in the lower pool on a still afternoon in late October. On the north bank, below the trail leading through the maples, is a planting of the mountain Fothergilla, *Fothergilla monticola,* which adds its orange-yellows and reds to the general riot of color in Woodland Garden. These shrubs are near relatives of the *Hamamelis* and have the typical leaf so common in that genus though they are much gayer in color than the witchhazels. Our plants are now about eight feet tall and were planted in 1950 or 1951.

Our list for Woodland Garden could continue with numerous viburnums, azaleas,

sumac, etc., but rather now let us move south over the ridge to Loderi Valley.

Loderi Valley may not seem a likely place to look for autumn's colors because of its many rhododendrons and generally shady aspect, but at the east end, near Arboretum Drive North, one of the finest of the larger trees puts on the first really good color of the fall season. These are the Katsura trees, both *Cercidiphyllum magnificum* near the road and *C. japonicum* on the bank to the northwest. This group usually starts to turn in late September and by early October their oddly round, oppositely arranged leaves are like so many golden coins strung along the slender twigs. When the late afternoon sun illuminates them one is reminded of a treasure chest spilling out ducats.

About the same time that the Katsura trees are at their best the large Sargent cherries at the west end of Loderi Valley are in their autumn finery. This cherry isn't restricted to this area but is found along the northern portion of Azalea Way and makes that walk a joy during early October. *Prunus Sargentii* is a big tree—our twenty-year-plus trees are nearly thirty feet tall and almost as broad—and one of the best cherries for autumn color, developing a bronzy-red with overtones of yellow. These, with various deciduous azaleas and the eastern dogwood, *Cornus florida,* are responsible for the glowing colors that nearly rival the spring display seen in this area.

Continuing south along Arboretum Drive from Loderi Valley we see the golden yellow of the tulip trees, *Liriodendron,* in the Magnolia section and beyond them, a hundred yards or so on the east side, stands a blazing torch of red, yellow, scarlet and orange. This is a single tree of the sassafras, *Sassafras albidum,* with its strangely lobed leaves and erect habit. Unfortunately, we don't expect the Sassafras to put on its best performance every year but even at its poorest it is very good and at its best has no peer. This may be due to the poor soil and dry conditions under which it is growing.

The area around Rhododendron Glen and the Camellia collection next commands attention with its plantings of Kousa dogwood *(Cornus Kousa), Franklinia alatamaha,* and the various *Stuartia* species. It would be hard to choose the best from this trio of fine genera since each gives a different effect in the fall. The Stuartias tend to develop somewhat somber bronzes in their dying foliage although *S. monadelpha* often wears a vivid scarlet coat in early November. The Franklin tree not only has a bright red leaf but may also be covered with two- to three-inch white camellia-like flowers as an added attraction. The Kousa dogwood colors slightly ahead of the other two, usually a fine crimson, with its attractive fruit, round and red, hanging below the gaily colored leaves.

South of the Glen on the east side of the road is the main collection of the *Hamamelidaceae,* the witchhazel family. In addition to *Hamamelis, Fothergilla,* and *Liquidambar* there are several other genera of trees and shrubs here that color well. The gayest is the shrubby Japanese *Disanthus cercidifolius* whose round leaves turn a striking purple-red shot through with gold. Our little group of four plants make a bright splash of color against the dark gray wood of the boundary fence in mid-October.

Returning again to the maples, for the genus *Acer* is the source of some of our finest autumnal color, we find a collection of various maples along this fence extending south on the east side of Arboretum Drive North from the Hamamelis area to the intersection with Lake Washington Boulevard North. These include several young trees of the red maple, *Acer rubrum,* especially selected for form or leaf color, and vigorous specimens of the sugar maple, *A. saccharum.* The sugar maples turn a soft orange and yellow as their leaves fade, contrasting well with the more brilliant reds of the red maples.

The few areas above have merely skimmed the surface of the fall display found throughout the Arboretum in October and early November; no mention has been made of the varied colors of the oak section, the rich

gold of the larches or the butter yellow birches near the south end of Azalea Way. Since there is such a wealth of material to be seen the following list will help Arboretum visitors find the wonderful array awaiting them in the fall.

PLANT	LOCATION	COLOR
Acer griseum, paper bark maple	Asiatic maple collection W. of Magnolias	fiery red
A. japonicum, full moon maple	E. of Winter Garden	red & yellow
A. nikoense, Nikko maple	E. of Winter Garden	rose red
Aesculus species (aff. *A. octandra)*	Old nursery S. of lath house	red
Betula species, birches	Foster's Island; center section of Azalea Way	gold to yellow
Cornus Nuttallii 'Eddiei,' variegated Pacific dogwood	W. parking lot at Magnolias	bronze & yellow
Crataegus Phaenopyrum, Washington thorn	Lake Wn. Blvd. opposite Interlaken Blvd.	orange & red
Euonymus alatus, winged euonymus	Across Blvd. from Japanese Gdn.	red
Fagus grandifolia, American beech	Oak section	yellow-brown
Larix species, larch, tamarack	South end of Azalea Way	yellow
Nyssa sylvatica, tupelo, black gum	Northern edge of oak section; S. of lath houses	red
Quercus coccinea, scarlet oak	Oak section	red to scarlet
Q. Frainetto, Italian oak	" "	yellow
Q. imbricaria, shingle oak	" "	bronze to tan
Q. marilandica, blackjack oak	" "	red
Q. Michauxii, basket oak	" "	rose red
Q. palustris, pin oak	" "	red
Rhus species, sumac	Woodland Garden	orange & red
Sorbus americana, American mountain ash	Sorbus collection, E. of Arb. Dr. N.	red-orange
S. decora, showy mountain ash	" "	red
S. Mougeotii	" "	yellow
S. rufo-ferruginea	" "	bright red
Taxodium distichum, swamp cypress	W. side of Blvd.	yellow to brown
Ulmus americana, American elm	Winter Garden	yellow
Viburnum species, viburnums	Woodland Garden, Viburnum collection, E. of Blvd.	red, scarlet
V. plicatum tomentosum	Blvd. in Oak section	yellow, purple dark red

Tree Selections for Fall Color

MAUNSELL VAN RENSSELAER*

Liquidambar styraciflua 'Palo Alto' is a selection made in 1954 by the Saratoga Horticultural Foundation, Saratoga, California, from a handsome tree of pyramidal habit. One of the noteworthy features of this cultivar is the bright orange-red color of its foliage in late autumn.

Propagation is by budding or grafting on 2- to 3-year seedling rootstock of the species. Growth in the first year is 4 to 6 feet; thereafter, from 2 to 3 feet. *Liquidambar styraciflua* is cultivated widely in California, prefers a deep, well-drained soil, and does best with at least two applications of fertilizer annually. The cultivar 'Palo Alto' requires the same conditions as the species.

In the past three years, *Liquidambar styraciflua* 'Palo Alto' has been grown by commercial nurseries and is now distributed widely in the United States.

Two other *Liquidambar styraciflua* selections of the Saratoga Horticultural Foundation are to be introduced in 1962.

Ginkgo biloba 'Autumn Gold' is a selection made in 1951 by the Saratoga Horticultural Foundation from an attractive oval-upright tree having strong, ascending branches. Since the species is dioecious, it is possible to propagate only the male forms, thereby eliminating the possibility of offensive smelling fruits. *Ginkgo biloba* 'Autumn Gold' is a male tree. The golden color of the leaves of ginkgo is surpassed in beauty in California

*Director of the Saratoga Horticultural Foundation since its inception, non-profit organization producing selected trees and shrubs for the wholesale market.

only by that of the aspen in the high mountains. Some say that the gold in the leaves of the cultivar 'Autumn Gold' is richer than that of the species, but this is not necessarily a claim of the introducers.

Ginkgo biloba is extinct in the wild, and yet it has remarkable regenerative powers. It may be propagated by seeds, by greenwood cuttings, by hardwood cuttings, by layering, by budding, and by grafting. The latter two methods are most commonly employed in propagating clones of this species. Second or third year seedling rootstock of the species is used.

Growth of *Ginkgo biloba* 'Autumn Gold' under favorable conditions in California is about 2 to 3 feet each year.

Among the cultivated trees having vivid scarlet autumn color in California is *Pistacia chinensis*. A selection of this species made by the Foundation in 1957 is sturdy growing, fruitless, and has a dramatic display of autumn foliage. This cultivar is to be introduced next year.

Fall Color in the Garden

Sallie F. Cole*

NATURE produces a stimulating and most beautiful year-long pageant, reaching a crescendo of brilliant color in the fall. Each plant has a personality which suits it to its role. Some deciduous trees and shrubs with conspicuous flowers take solo parts in the spring and early summer, holding the center of the stage for a time, then fading into the background. Some plants, such as the dogwoods and crabapples, step into the spotlight for a second time in the fall, while Liquidambar, with its brilliant foliage, stars but once.

The list is long of trees grown for their brilliant foliage, but the oaks deserve more than a passing glance, because their habit of slow growth makes them desirable trees in the smaller garden. All supply color in the fall. The pin oak, *(Quercus palustris)* warrants special mention. It is a symmetrical tree, whose leaves turn a bronze red in the fall, then crinkle up and fade to a soft brown. These leaves hang on almost into spring. They remind one of the acrobats in the pageant. They defy the laws of nature and one cannot help but admire the tenacity with which they swing around as they resist wind, rain and cold so that the show may go on.

A much more delicate and modest appearing tree (especially when young) is our own native *Larix occidentalis,* the western larch, a deciduous conifer. At a season when all the other conifers are standing strong and stately, the needles on the slender pendulous branches of the larch have turned a soft yellow and as the fall winds increase in vigor they float quietly to the ground, leaving the tree with a shorn appearance. This is an interesting contrast to the vigor of the pin oak, and all artistic productions need contrast.

Many plants play very important supporting roles in this pageant. Some bloom for a short time, forsythia and lilac for instance, and then for the balance of the season supply green background for summer annuals and fall blooming perennials.

This soloist and accompaniment arrangement is particularly evident in the fall. The new foliage on the broadleaved evergreens has taken on a feeling of maturity. The varying shades of green are a beautiful accompaniment to the mountain ash *(Sorbus aucuparia)* as it reaches toward the sky in a show of soft yellow leaves overlaid with clusters of red berries. To enjoy the taller trees one must look up and the sky becomes an important part of our picture, especially when our tree stands alone!

We live somewhat more intimately with trees that grow less tall. The leaves of our native vine maple *(Acer circinatum)* for in-

*Mrs. (Edward B.) Cole is a member of our Normandy Park Unit No. 21 and a well-known lecturer on garden topics.

stance, look like stained glass when planted so the sun serves as backlighting. Again for maximum enjoyment there should be no competition for attention.

On the other hand, such trees as *Cornus florida* 'Rubra' or *Cornus Kousa* show off to best advantage if planted in a bay of broadleaved evergreens. Their leaves are thick and curved, and lack the transparent flat appearance of the vine maple. They do not reflect the light.

We live still more intimately with trees and shrubs 15 feet tall or less, and it is in this area where most of our plants take their places and where we are conscious of the structure and color of every leaf, flower and fruit. Our taller trees as accent points having been established, it is here that thought, planning and restraint produce the most pleasing effects.

It is here also that we choose plants to live together, where each has something in common with its neighbor, or where they complement each other in some way. An example for fall would be *Oxydendrum arboreum,* with its pointed brilliant fall foliage, surrounded by *Pieris Forrestii.* Each has the same shaped leaves, and the color and shape of the flowers is the same. They have everything in common all spring, summer and fall, only one is deciduous, one evergreen.

Another combination might be *Arbutus Unedo,* the strawberry tree, and *Euonymus alatus.* Both have straight, stiff upright stems. The glossy evergreen leaves, the creamy flowers and orange red fruit of the Arbutus complement the brilliant fall foliage of the Euonymus, but more than that, there is the contrast of foliage pattern and texture for added interest.

A drift of *Azalea mollis (Rhododendron japonicum)* makes an interesting gray and maroon scene if *Cedrus atlantica* 'Glauca,' *Picea pungens* (Blue Spruce), or other gray conifers, some distance away, are visible as a background. Hydrangeas are effective used the same way. The soft gray-pink and blue-purple flowers are lovely with a gray background. The combinations are endless, depending only on the space available and the wishes of the gardener.

Berries are also an important part of our fall scene. Again these shrubs and trees are most effective if allowed to be the center of interest in a given planting. The feeling can be very restless if berries are spotted indiscriminately. In a small area, to achieve a feeling of balance, we might use *Cotoneaster lactea (Parneyi)* for height in the center, and the lower growing *Skimmia Reevesiana* in quantity at each end, if we can provide enough shade. Both plants are evergreen, with contrasting leaf texture. Both plants have red berries, and would complement rather than compete with each other, especially if *Erica carnea* 'Springwood' heather were used as a ground cover under the cotoneaster. The combination would extend our color through the winter.

When the leaves begin to fall from the deciduous trees and shrubs then the branching pattern becomes an important part of our design. The staghorn sumac *(Rhus typhina),* if properly pruned, is a never-ending delight in the winter; especially if it is allowed to cast a shadow on the lawn, on the house or walk, or on the fence. The Japanese have taught us how to sculpture trees for interesting shadow effects. There are many of the taller shrubs and smaller trees which could add real winter charm to our gardens if we would but groom them.

Still another creation of more subtle beauty in nature's pageant is the texture and color of the bark of some trees as they grow to maturity. There are many, but these familiar to all immediately come to mind. The rugged texture of the Douglas fir *(Pseudotsuga Menziesii (taxifolia)),* the warm glossy colors of the madrona *(Arbutus Menziesii)* in the rain, the trunks of the paper birch *(Betula papyrifera),* smooth and gray white, mottled with black, and the smooth chartreuse vine maple *(Acer circinatum).* All are Northwest native trees.

Then the rains come and the leaf texture of the broadleaved evergreens becomes important. The glossy leaves of the madronas,

the camellias, Ternstroemia, etc., all glisten and reflect light even on the darkest day. At the same time the tall firs wear a veil of gray mist and seem ethereal.

As fall fades into winter the holly is brilliant with red berries, and cones hang heavy on the conifers. In the woodland garden the birds and the chipmunks now vie with each other for food from seed and berry. *Camellia Sasanqua, Viburnum Tinus,* the hellebores and the winter heather are in bloom. The flower buds of *Pieris floribunda* stand perky and upright on the tip of each branch, while the buds on the rhododendrons are nestled in a swirl of leaves, all waiting and resting for the spring scene. Everything is in readiness and "if winter comes, can spring be far behind?"

We who try to create a garden to capture some of this beauty for our own, face a very real problem. There are so many beautiful plants to choose from. How can one use restraint? How choose only those plants suitable to the environment we have to offer? How choose our few soloists and those in quantity for supporting roles? How supply each tree and shrub with room enough to grow uncrowded, so its true beauty may be enjoyed? This takes study and selectivity, but the rewards are many. There are really no dull days in a well-planned garden.

The study is available to us through the Arboretum, with its BULLETIN, lectures, classes and tours. The selections are up to us. Help is available simply for the asking. Thought and effort on our part will lead to many hours of happy gardening, and will open new vistas of interest and appreciation of Nature's tremendous pageant, no matter where we may roam.

Why Leaves Change Color in the Autumn

RICHARD B. WALKER*

WE have all seen normally green leaves turn to a yellow, golden, or reddish shade during the autumn season. Possibly many have wondered just what happens in leaves to make possible this often spectacular change. Even more, one is likely to wonder how climate, weather, the nature of the plant species involved, exposure to sunlight, or other factors, make for variations in the nature and intensity of the color changes. Although all aspects of these processes are still not fully understood even by specialists in plant physiology, the general nature of the changes will be described in the sections which follow.

Leaf Pigments

The color of most leaves is some shade of green, although some are variegated and some may be red. All leaves, even the red ones, contain two principal colors or classes of pigments.

The first of these classes is the chlorophylls, well known for their green color. Most plants contain two separate but very similar chlorophyll pigments. The chlorophyll is situated in the chloroplasts, which are microscopic bodies that are part of the protoplasm of the leaf cells. The chlorophyll plays an essential role in the process of photosynthesis, in which carbon dioxide and water are combined into carbohydrate food using energy from light.

The second class of pigments is the carotenoids, which are yellow or orange, but whose color is ordinarily masked by the green color of the chlorophyll which is also present. There are two types of carotenoids, the carotenes that are usually orange in color, and the xanthophylls that are yellow. The carotenoid pigments are contained in the chloroplasts along with the chlorophyll, or may be present alone in similar but yellow plastids, which are called chromoplasts.

Those leaves which are partly or wholly pink or red (e.g. red-leaved *Prunus,* maples, and beeches), contain red pigments which mask the green and yellow ones which are

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also present. These red pigments are very different from the other types, as they are soluble in water and are dissolved in the central water droplet (vacuole) of cells rather than being in plastids. Although leaves of some species and varieties contain red pigment throughout the growing season, most leaves contain little or no red color during the spring and summer. Many of these may develop red color during the autumn, however, and this is considered in a section which follows.

Development of Yellow and Golden Colors

For a leaf to stay green, chlorophyll must be constantly synthesized, for it is always being destroyed at a certain rate even in active leaves. As late summer or autumn comes, the metabolism of leaves becomes less active, and among other things, the rate of chlorophyll formation slows down. At the same time the rate of chlorophyll breakdown increases, for reasons not well understood. The net effect of these changes is the loss of the chlorophyll of the leaf.

However, when the chlorophyll is gone, the leaf is not colorless. The yellow pigments are more stable than the chlorophyll, and remain intact as the chlorophyll disappears. Thus we see that many leaves have a yellow color as soon as the chlorophyll disappears. The shade of color depends on several factors. If carotenes predominate, the leaves may be orange, or if xanthophylls predominate, a clear yellow color may result. The presence of tannins in the leaf may modify the shade also, being especially important in the development of golden tones.

The leaves stay alive during the change from green to yellow, even though they are senescent, and often remain alive until they are shed in the late autumn. Death of leaves still attached to the tree is indicated by their turning brown. Heavy frosts may ruin the yellow colors by killing the leaves prematurely.

Development of Red Colors

The water-soluble anthocyanin pigments mentioned earlier are the ones involved in the development of red shades. Although all species which develop red leaves in autumn probably have some of the red pigment in the leaves earlier in the year, the amount greatly increases in the autumn if conditions are favorable. In such leaves the red colors develop about the same time that the chlorophyll is disappearing, so a clear red unaffected by green is seen. Usually the yellow pigments are still present, but they are masked by the red ones.

One of the most interesting aspects of the formation of red colors is the influence of weather and other factors on the development of anthocyanin colors. Experiments along this line have been difficult to perform because of the short time involved in pigment synthesis. Experiments and observations indicate the following, although some differences of opinion exist in some instances.

1. *Genetics of the plant*

Hereditary factors are important in the production of anthocyanin pigments. Some plants have a natural tendency to form abundant pigment, and these are more likely to be an attractive red color in the autumn. For example, the red maple forms abundant anthocyanins in the young twigs and developing leaves, and turns a brilliant red in the autumn. On the other hand the sugar maple shows very little red color in the young leaves, and in the autumn has much less in the leaves.

2. *Sugar level in the leaf*

In the autumn several factors combine to cause the production of high sugar contents in the leaves. Light intensity is still favorable for photosynthesis (of which sugar is an early product), the lower temperatures reduce movement of sugar to other parts of the plant and reduce use of sugar in cellular oxidation, and often corky abscission layers develop at the bases of leaves which restrict movement of food material out of the leaves. The red pigments are readily formed from sugar in the enzymatic reactions of the leaf cells, and there is a tendency for the antho-

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Fall Color in Eastern Washington

R. L. WOERNER*

IN MANY of the inland areas of the west fall color is limited to the yellow tones of the aspen, cottonwood and larch. Introduced trees and shrubs have added scarlet and orange hues in limited amounts, for many of the drought resistant, fast growing varieties planted to soften the bare treeless areas lack fall color altogether. Some of the more notable trees and shrubs to be recommended are:

Large Trees

Norway maple, *Acer platanoides;* widely planted as a street tree, usually most effective as a group or row planting. Color varies from clear yellow to yellow-orange.

European white birch, *Betula pendula;* bright yellow foliage is an extra bonus from this tree. Often planted as a specimen, its white bark and winter effect make it an ideal landscape subject.

Thornless honeylocust, *Gleditsia triacanthos* 'Inermis'; this tree and its newer patented varieties make excellent shade trees. Their tiny leaflets are a bright yellow in the fall.

Sugar maple, *Acer saccharum,* occasionally seen as a street or lawn tree. This and the red maple, *Acer rubrum,* should be used more for the red fall color of their foliage. They are slow to become established as shade trees in inland regions which limits their popularity.

Pin oak, *Quercus palustris,* and scarlet oak, *Q. coccinea,* are slow growing but prized for their scarlet foliage. Pin oak is subject to chlorosis in alkaline soils, but the use of chelating agents easily corrects this.

Northern red oak, *Quercus borealis maxima,* grows a bit faster and is more tolerant of soil conditions. Its fall color is a duller red than scarlet or pin oak.

Small Trees

European mountain ash, *Sorbus aucuparia;* widely planted and one of the most colorful small trees in the fall. The bountiful crop of orange fruit plus the red foliage make it a favorite. Good for the low modern house, but plant away from sidewalks or driveways because of the fruit.

Flowering dogwood, *Cornus florida;* usually less than twenty feet in height but a reliable performer with ruby red fall color.

Washington hawthorn, *Crataequs Phaenopyrum,* is the most colorful of the hawthorns in the fall. Small bright red fruits add to the display of the orange to scarlet-red foliage.

Amur maple, *Acer ginnala,* usually a multistemmed, shrubby tree that is well adapted to modern landscaping and perfectly hardy. Its small leaves turn a brilliant red.

Japanese maple, *Acer palmatum,* will not grow in all parts of the state, but the species seems reasonably hardy with some protection. Cutleaf varieties should be chosen with care for inland areas. Select container stock in fall to obtain best red coloring forms. Usually less than 10 feet high.

Staghorn sumac, *Rhus typhina,* usually shrubby, but often a loose, open, small tree. Very tolerant of poor, dry soils and excellent for bank plantings. Compound leaves turn bright orange and red shades. Too coarse a plant for refined plantings, but a striking specimen when properly used.

Shrubs

Japanese barberry, *Berberis Thunbergii;* the brightest red spot in the fall shrub border is provided by the tiny leaves of this tough, adaptable plant. A medium size shrub, it can be used for hedges, bank plantings, a facer for tall shrubs or a specimen.

Peking Cotoneaster, *Cotoneaster acutifolia,* is receiving more use in recent years. Its attractive small leaves add to the red hues in the fall garden. A tall shrub to 10 feet or more it can be used for a screen, clipped or unclipped hedge, or in the shrub border. It

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How Green Is Our Greenhouse

Betty Gray

EVERY Tuesday morning the year around a group of eager women gather at a greenhouse at the University of Washington Arboretum. They are there to propagate cuttings of woody plant materials, pot up rooted cuttings, scrub clay pots, weed, spray, fertilize and do whatever else is essential to the operation of a greenhouse.

The greenhouse belongs to them, for they are members of Arboretum units. Its existence is the result of a dream come true.

The idea of building a greenhouse undoubtedly stemmed from the enthusiastic response to classes in the propagation of woody plant materials conducted in the summer of 1958 by Mr. Lawrence Michaud, the nursery foreman at the Arboretum. The method taught, using small flats covered with pliofilm, was satisfactory for propagating on a small scale. Class members were delighted with their success in propagating, but now they wanted to have a way to root plant materials that were more difficult. Wouldn't it be wonderful to have a greenhouse with thermostatically controlled soil cables, mist lines, etc., available for the use of members of Arboretum units?

One of the class members was Mrs. Frank Calvert, who at that time was starting her second year as chairman of the Unit Council. Conversation grew concerning a greenhouse for the use of the members and Mrs. Calvert started seriously investigating the possibilities. The subject was raised at a Unit Council board meeting in October, 1958. Approval was expressed if permission could be obtained from the University of Washington and the Arboretum. Mr. Brian Mulligan, director of the Arboretum, the Arboretum Board and finally the Arboretum Foundation decided it could be done. Mrs. Calvert then started negotiations with Ever-Green House Inc. regarding specifications and costs.

Editor's Note. Mrs. Connor E. Gray, Jr., who worked so constantly to make this scheme a success, has now been succeeded as Greenhouse Chairman for the Arboretum Unit Council by Mrs. Thomas O'Brube.

It was necessary that this greenhouse meet very unusual requirements because it was to be operated completely by women volunteers without professional help. Consequently, it needed to be as self-operating as a greenhouse could be. It was proposed to accomplish this by several means. Final plans called for a greenhouse 41′x16′ with an attached potting room 15′x16′. One of the three benches was to have thermostatically controlled soil cables. Over this propagating bench was to be a mist line. Another mist line was to be placed under the center bench for extra summer humidity. The mist system and the ventilator fan were to tie into a temperature-humidity control unit which would regulate their operation. The greenhouse was to be heated by automatic 220-volt heaters. Construction specifications and costs were approved and work began. It was completed in early July, 1959. Mrs. Frank Dupar, as chairman of the greenhouse committee, worked diligently seeing that the benches were graveled, in contracting for cabinets in the potting room and in general equipping the greenhouse for actual operation.

Groups of women at random started to work in the greenhouse. It soon became evident to Mrs. Jack Ogle, who was by this time the new chairman of the Unit Council, that some one person was needed to take charge of the propagating and direct the activities of the volunteers. She asked me to take on this responsibility. I was elated at the opportunity, as plant propagation had been a hobby of mine for some time. I had no greenhouse of my own, and a person more innocent of greenhouse procedures would have been hard to find. All my past experience had been with a cold frame, minus even a heating cable.

At the Unit Council's September meeting, I asked for volunteers who wished to work in the greenhouse. The response was most remarkable and from this list of names I started organizing groups to work in the

greenhouse. It was soon obvious that a specific day in the week needed to be scheduled and Tuesday became greenhouse day. This was to avoid conflicts with education classes using the greenhouse as well as Units wishing to propagate. In order to avoid my being on duty every Tuesday, it now became necessary to appoint several supervisors who could take charge of volunteer groups. Mrs. Lawrence Dickman was one of those who came to my assistance and sustained me through several crises that first winter.

We were most successful in rooting cuttings that first summer and fall, having an average of about 90 per cent strike. However, as we potted them up and moved them on to the other two benches we were suffering far too great a loss. We were using peat pots for our potting and discovered that, though we watered carefully as we potted, the plants still seemed to be drying out too quickly. A simple experiment proved to us that each of the three-inch peat pots absorbed one-fourth cup of water. As a result they were drawing too much water from the soil around the newly potted plants. We licked this problem by placing the peat pots with the rooted cuttings into flats and packing damp peat moss around them. These flats were then placed back on the mist bench for one week. This reduced our mortality rate considerably.

We now had another problem on our hands —little black flies. They became so bad they would rise in clouds whenever we watered or otherwise disturbed the plants. The eggs were laid in the potting soil around the plants and we'd see the larvae squirming around on the soil and on the outside of the peat pots. Spraying consistently controlled, but did not eliminate, these pests so we switched to clay pots and a pea gravel mulch on top of the soil in which our rooted cuttings were placed. This procedure did away with our fly problem.

As spring approached, the need arose for space outdoors for growing on our plants. Mrs. Dupar obtained estimates for a 40′x6′ cold frame on the north side of the greenhouse. With Mr. Mulligan's sanction, and the approval of funds by the Unit Council, work began. The cold frame was completed in the late spring and within six weeks or so we had it completely filled with plants from the greenhouse. Still we had more plants that needed to be outdoors and in the ground. We were able to "borrow" some space in one of the Arboretum's cold frames.

In the meantime, summer had arrived and the Units were eagerly making use of the greenhouse. During the year a total of 16 units used it to propagate plant materials for their own gardens. We allowed room for six flats per Unit with a time limit of two months. It was determined that the Unit members would be allowed one-half of the mist propagating bench and the rest of the space allotted to raising plants for the annual plant sale. Fortunately, some of the Units reserved space for the fall months so we were able to accommodate everyone.

The greenhouse, in providing its third service to the members, had been the scene of many classes in propagation by seed and cuttings. About eighty people attended these classes taught by Mr. Michaud or Mr. Joe Witt, the assistant director of the Arboretum.

As time approached for the fall plant sale in October all work shifted into high gear. Our spraying, fertilizing, pinching, pushing and just plain praying had paid off and an inventory taken on September 12, 1960, showed we had 2,203 plants on hand. The larger and sturdier of these were selected to go into the sale scheduled for October 6. How could we get such a quantity of plants canned, labeled, priced and ready for the sale ahead of time and still keep them in good condition? Many were still in the greenhouse and it was essential that they be canned at once and placed outside to harden off before sale time. Finally we came up with the idea of a sawdust bed in which the canned plants could be buried in damp sawdust and thus be maintained in good condition until ready to be moved down to the sale area. This was a very successful solution.

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Hypericums for Summer Bloom

ROBERT L. PLAISTED*

IN initiating a breeding project with woody ornamentals, I was attracted to the genus *Hypericum* for the possibilities it appears to have for improvement through breeding. It is a large genus with a wide range in bush character, flower size and character, leaf form, and hardiness. Its habit of blooming from July through September fills a need to complete the season after most of the spring and early summer flowering shrubs have had their show.

Our first efforts were directed toward making a collection of as many species as we could find. In this we were aided by the use of the catalog maintained by the L. H. Bailey Hortorium. We obtained about 150 species which were all grown in a nursery in the field. Only about 50 of these appeared to have ornamental value and have been maintained. Since our winters are quite severe, we have found it necessary to take cuttings of most of these and carry them over winter in a greenhouse. The survival of most of the species in the field has been discouraging.

The shrubby species which have been dependably hardy are those native to Northeast America. Of these *H. frondosum* is the most attractive. Unfortunately the names *prolificum* and *frondosum* are often used interchangeably by the trade. For this reason some clones are superior to others. The best of these have bright yellow flowers which are about one inch in diameter, borne in groups of three at the end of each branch. The most distinctive aspect of this species is the unique doughnut-like ring of anthers in each of the flowers. The blooming period is from the middle of July until early August. However, by hybridization with *prolificum* and subsequent selection we have been able to extend the date of bloom until late October. *H. frondosum* grows to about 4 feet in height. It has one or two woody trunks with attractive exfoliating bark. Unfortunately these trunks are quite brittle and need to be protected from heavy loads of snow. *H. prolificum* produces a larger number of smaller flowers and probably is hardier than *H. frondosum*. We have found that these two species hybridize readily and offer considerable opportunity for selection.

For the past two years, much of our effort has been directed toward obtaining hybrids between *H. frondosum* and the species native to Europe and Asia. So far our efforts have been completely unsuccessful. Since the chromosome number of *H. patulum* and similar species is twice that of *H. frondosum* we treated seeds of *H. frondosum* with colchicine and doubled its chromosome number. These crosses were unsuccessful also. However, one of these tetraploid plants of *H. frondosum* appears to be quite superior to the diploid parent. Cuttings have been made and further tests will be made to evaluate its worth relative to existing clones.

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Below:

Hypericum Patulum 'Sungold'

FIG. 10 PHOTO: COURTESY DR. PLAISTED

We have grown *H. frondosum* in full sunlight on soil which in one place was very gravelly and in another place which was quite heavy. Currently we are investigating the possibility of crossing *frondosum* with another native, *H. virginicum,* which grows in sunny areas of swamps. It has a pink flower which we would like to introduce into the ornamental hypericums. The only red color in *frondosum* now is in the maturing capsule. After the petals have dropped, the capsules on some of our selections have turned a dark crimson which adds to the length of show of this bush.

One species which has proven to be surprisingly hardy here is *H. calycinum.* This is a stoloniferous shrub from Southeastern Europe and Western Asia which produces a dense ground cover about one foot in height. It has dark green, leathery leaves and flowers almost 3 inches in diameter. These are bright yellow with numerous stamens tipped with red anthers. While this is an evergreen shrub in warmer climates, here it holds its leaves well into December. These turn a bronze color in the fall and are not unattractive showing through the light snows we often get at that time of year. Unfortunately it is slow in recovering new growth in the spring. However, I have been able to work this to my advantage by planting daffodils amongst the hypericum. These produce their characteristic early show and by the time the daffodil leaves are starting to turn yellow, they are hidden from view by the new growth of hypericum.

H. calycinum is a strongly competitive stoloniferous plant. A few cuttings spread to fill a bed. I have read reports that it thrives in semi-shade. My own experience with it has been in full sunlight on a bank with a western exposure.

Like *H. frondosum,* several clones of this species are available and some are more desirable than others.

In areas of less severe winters, other species should be considered. Foremost among these are those species which, for my own convenience, I have called the *patulum* group. Of these I would list *H.* X *Moserianum, H. Hookerianum, H. penduliflorum,* and *H. patulum* 'Hidcote' and 'Sungold', as being among the more attractive species. During the early summer these plants have an arching habit of growth with the green leaves making an interesting contrast with the pink stems. In July and August yellow flowers one and one-half to two inches in diameter make a welcome display.

It is reported that *H.* X *Moserianum* arose from a cross between *H. patulum* and *H. calycinum* made in France in 1887. This is interesting in that the one species has a haploid chromosome number of 18 and the other 10. While we have not examined the chromosome number of *H.* X *Moserianum,* we have demonstrated that this cross is not difficult to duplicate.

Another species worthy of consideration is *H. Androsaemum.* This is distinctive for its large leathery leaves. The flowers closely resemble a buttercup in color, shape, and size. The fruits are bright red berries which contrast well with the dark green leaves.

Below:

Hypericum Androsaemum

FIG. 11 PHOTO: COURTESY DR. PLAISTED

Hypericums in the Arboretum

B. O. Mulligan

THE first plantings of these useful summer-flowering shrubs were made in the fall of 1949, in several beds prepared for them between the upper road and the Broadmoor boundary fence, south of Rhododendron Glen; the soil is light, sandy and very well drained, the site open to the east but partially shaded on the south and west by native big-leaf maple trees. Additions or replacements were made in 1950 and several subsequent years, until now the collection is more or less stabilized and we have a fair knowledge of what kinds can be successfully grown here, as well as of those which sooner or later are likely to fail.

As Dr. Plaisted indicates, those of the *H. patulum* group include the most ornamental species for west coast gardens. Pride of place amongst them must go to the plant named "Rowallane," a spontaneous seedling which appeared in the garden of the late Mr. Hugh Armytage Moore near Belfast, N. Ireland, about 1935-37. This we received, as cuttings, from Mrs. A. C. U. Berry, of Portland, Oregon, in 1948, and although it has been cut to the ground more than once since planted in June 1950, and occasionally killed, we have managed to retain it by rooting a few cuttings each fall. It is undoubtedly closely related to the eastern Himalayan species *H. Hookerianum,* having its round stems, large ovate-oblong, semi-evergreen leaves, and handsome bowl-shaped golden flowers. We have examples both in the collection and in the border at the west end of the offices, a warmer and more protected situation which it appreciates. Of all our Hypericums this undoubtedly has the longest flowering season; it is not unusual to find fresh blooms on the young shoots in October and November if the fall is wet and mild. It is advisable to prune back the previous year's growths in March or early April to one or two inches from their base, and at the same time to apply a 3-inch mulch of compost or old farmyard manure around the root area; such attentions will certainly improve both the quantity as well as the quality of the flowers that season.

We do not possess any typical and authentic plants of *H. Hookerianum.* Those which have been raised from seeds sent us from various sources under that name have generally turned out to be *H. patulum,* a species originally introduced from Japan but having variants also in W. China *(Henryi* and *Forrestii)* and the Himalaya *(oblongifolium* and *uralum).* We have what may be more or less normal *H. patulum,* with its two-edged stems and smaller, less substantial yellow flowers than *H. Hookerianum,* a plant believed to be var. *uralum,* which blooms later than the former, having small bowl-shaped light yellow flowers 1-1¼ ins. across, and finally quite a distinct form raised from seeds sent from S.E. Tibet in 1948, notable for the short (¾ in. long) blunt leaves with undulate margins and marked reddish coloring in late summer and fall. The flowers of this are sparse and undistinguished.

Of somewhat different appearance and habit from *H. patulum* is the plant named 'Hidcote', from an English garden whence it was introduced to commerce and this country. This forms a rounded bush, in contrast to the normally upright shape of *H. patulum,* and is semi-evergreen, perhaps indicating some influence of *H. chinense* or another evergreen species. The latter, incidentally, is a desirable, low-growing species from China and Japan which thus far we have been unable to obtain true to name from any source.

Another Himalayan species represented here is *H. cernuum,* which we grew from seeds obtained from the Royal Botanic Gardens, Kew, London, in 1945. These are now bushes 5-6 ft. tall, having a longer flowering season than *H. patulum,* and distinct in their obovate petals reflexing at maturity; flowers are 2-2½ ins. wide, golden yellow like their relations.

The allied *H. kouytchense* (from the prov-

ince of Kweichow, W. China), has not been a success with us; after ten years trial it has attained 3-4 ft. in height but evidently resents the poor soil and the conditions under which it is forced to grow.

A semi-evergreen species worthy of mention, but from quite a different part of the world, is *H. elatum* from the Canary Islands, off the N.W. coast of Africa. This possesses much larger leaves than any of the others already mentioned, cordate at the base and stalkless, slightly fragrant when crushed. The flowers are small, only ¾ in. in diameter, with reflexing petals, but are succeeded by definitely ornamental sprays of reddish colored ripening fruits in August and September, which finally become brown and dry and split to release the minute seeds in winter or early spring. After twelve years we still have most of the original plants, despite two severe winters, so it is evidently hardier than might be imagined from its native home. In S.W. England and western Scotland it has become naturalized, but apparently not yet in N. America. The closely related *H. Androsaemum,* of which the common English name is Tutsan, from the French Tout-sain, all healthy, grows beside it, but is of smaller stature (2-2½ ft.) and the fruits become black and fleshy when ripe.

History of Rose 'Ruth Alexander'

Faris M. Blair*

A SHORT time ago I asked Mr. Mulligan to visit my garden so that I could show him some clematis seedlings that I have been raising. While he was here I showed him a plant of the rose 'Myra'. This plant was given to me by Miss Rena Wilber who had produced it by cross pollination, using pollen of 'Lady Roberts', a very pretty tea rose, on 'Dr. Van Fleet', a vigorous climber having clean shiny foliage. 'Myra' is a very vigorous climber having blooms that are more or less white and not attractive, yet there were genes capable of transmitting hidden qualities when crossed with 'Constance Casson'.

'Constance Casson' is described in *Modern Roses IV* as; "H.T. (B. R. Cant, '20), 'Queen Mary' X 'Gorgeous', double, fragrant, carmine, flushed apricot." I do not find 'Queen Mary' in that book. 'Gorgeous' is described; "H.T. (H. Dickson, '15), large, very double, well formed, fragrant, deep orange-yellow, veined copper; long strong stem. Foliage large, rich green, soft. Bushy, open". 'Myra' X 'Constance Casson' gave the climber 'Ruth Alexander'. That is really the rose with which we are concerned.

I attempted to get more information about Miss Wilber and found that the *Seattle Times* had published one article about her and her rose work on June 5, 1936 and another July 28, 1946.

Mr. George Schnellhardt had a nursery at the time that Miss Wilber was doing her work and was able to get some information for me by asking some of his garden club friends. As a result, Mrs. George Tuerk, 19747 40th Place N.E., Seattle, sent him a clipping from the *Seattle Times* dated June 5, 1936. I enclose a copy which I typed from that clipping. I then called the *Times* to find if they had more in their files. The lady at information was very kindly and cooperative. She offered to have copies made of the articles. She sent me the one dated July 28, 1946.

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*Dr. Blair has been kind enough to enquire into the history of this beautiful and vigorous rose for us—one of the features of the Arboretum in June.

Editor's Note. The 1936 clipping shows that this rose was named in honor of Mrs. H. F. Alexander, a member of the Seattle Garden Club, and that it was granted a patent the previous week by the U. S. Patent Office. This (No. 178) has now expired, and the variety can therefore be freely propagated and distributed. In its season, which is unfortunately very short, it is a most beautful rose, especially in the bud stage, and as the foliage is large and glossy green, it is an excellent rose for screening a fence, as it is used along the eastern boundary of the Arboretum, where it was planted in 1938, the fifty original plants having been given by the North End Flower Club and Miss Wilber. The latter was one of the founding members, in 1919, of this active club and two years later became its first president.

Search for the Chinquapin in the State of Washington

THEO. H. SCHEFFER*

FOLLOWING UP an account in the Summer issue of the *Arboretum Bulletin*, 1958, which dealt with the Chinquapin as a rare species of tree in the State of Washington, we have undertaken further research on affinities and distribution of this tree, or shrub, as we find it here. In our report on the subject we will try to avoid duplication of information given by Mr. C. Frank Brockman in his story of the tree.

In our investigations we tried to make a close study of the only two locations in Washington where the Chinquapin was reported to be growing. One of these was in the upper gorge of the Columbia River, in Skamania County, the other on Jorsted Creek of the Olympic Peninsula. The location of the Chinquapins on the Jorsted Creek drainage area is the only one up-state in Washington and our inference is that it was probably seeded there by nuts of the species which were carried in the crops of band-tailed pigeons from Oregon or from the Washington location on the northern bank of the Columbia near the town of Stevenson. The eminent botanist, David Douglas, reported that he once shot a band-tailed pigeon with its crop full of Chinquapin nuts which could not have been obtained at a lesser distance than 200 miles from where he shot the bird and examined its stomach. Such distribution might well account for the seeding of the Chinquapin grove on the morainic ridges of the Jorsted Creek drainage area.

On a recent visit to this area we found the Chinquapin shrubs fairly well distributed but nowhere in extensive groves. The trees are shrubby and more often occur in clumps of several trunks a few inches in diameter and 20 to 25 feet high. Apparently the species does not occur as a tree in this, its most northern range. It is officially reported not to occur at all in British Columbia.

On an earlier trip to this Jorsted Creek location, September 1 last year, we had found a more open grove of the trees in the fruiting stage. The seeding burrs were being cut from the trees at that time by chipmunks or red squirrels and the enclosed nuts were ripening. These looked precisely like small chestnuts and the burr itself could not be distinguished from a chestnut burr except for its smaller size.

The Chinquapin trees in the Columbia gorge location occur in several situations. We were unable to contact the trees reported in the herbarium collections as from Moffat Springs. But after considerable search we came upon the Willard Guard Station of the Pinchot National Forest where we found a ranger who guided us to the location of several small stands of the Chinquapin. Here the trees were about as we had found them in the Jorsted Creek location—in clumps of several trunks, a few inches in diameter and perhaps twenty-five feet high. Some of them were probably mature trees but as there was snow on the ground we could not determine whether or not they had borne fruiting burrs this season. These clumps of trees might readily have been seeded by birds carrying the nuts from the Oregon shores of the Columbia River. The herbarium at Oregon State College, Corvallis, contains a number of specimens of the Chinquapin from the Oregon range across the river from Washington.

From our knowledge and observations of the Chinquapin as it grows in the State of Washington, we can see no reason why it should not be used as a valuable addition to our landscape plantings about home premises and along roadsides. For such use it should be limited to a single trunk so that it will assume its beautiful spire-like conical shape,

(Continued on Page 96)

*A further contribution from our faithful correspondent Mr. Scheffer, Collaborator, U. S. Department of Agriculture.

What's Happening in the Arboretum

On July 3, 1961, your president received a letter from Mayor Gordon S. Clinton stating that he had on that day signed an ordinance recently passed by the City Council which reads as follows: "Be it ordained by the City of Seattle . . . that the proposed limited access thoroughfare from the South City limits to Bothell Way, here-to-fore referred to as the Empire Way Expressway, is hereby designated as the 'R. H. Thomson Expressway' as recommended by the Mayor and the City Engineer in C. F. 242685."

Members of the Foundation will be reminded that this is the new expressway that is now proposed to be located on the west side of the Arboretum. It will be an important north and south route through the city. The new name honors a former City Engineer of Seattle who had much responsibility in laying out the streets and boulevards as well as the Cedar River Watershed, the Lake Washington Ship Canal and the metropolitan sewer system.

* * *

The Foundation has recently completed the setting of some 25 terrazzo benches throughout the Arboretum. A substantial number were the gifts of Arboretum Units and the rest were made possible by the memorial fund.

* * *

Construction has now been started on an additional gate to the Japanese Tea Garden. It is located at the south end of the garden where automobiles and busses may unload without blocking the boulevard. The cost of the new gate is being borne equally by the memorial fund and the University.

* * *

This summer visitors to the Japanese Garden have been averaging over 2800 per week. Total number of visitors in June and July was 23,005.

* * *

Studies are being made for a sprinkler system for the Japanese Garden. We hope that definite plans will be forthcoming shortly.

At the Annual Membership Meeting held September 13, 1961 elected as Officers for the year 1961-1962 were: Wm. D. Shannon, President; M. C. Collarino, Vice-President; Thomas Telfer, Vice-President; Mrs. Pendleton Miller, Vice-President; Mrs. John Schwager, Vice-President; Mrs. Henry Schmitz, Secretary and Donald K. McClure, Treasurer.

Elected as new members of the Board of Directors were: Mrs. Clarence Ambrose, E. B. Clark, Mrs. Paul Pigott, Mrs. John Schwager, Mrs. Thomas D. Stimson, Mrs. Patrick J. Cummins, Enumclaw, and Mrs. William Wenner, Port Angeles.

This is your Arboretum,

kept alive by your support

We are pleased to welcome the following new members (June 8 through September 7, 1961) *Contributing*—Mr. and Mrs. Herbert Brink, Dr. and Mrs. Frederick Christopher. *Sustaining*—Clifton Nursery & Garden Store, Mrs. Robert E. L. Faris, Mr. and Mrs. Roderic Olzendam, Mrs. Sterling J. Peterson. *Annual*—Mrs. Rodney B. Allen, Mrs. Gene Azud, Mrs. Arthur A. Binnie, Mrs. Merrill M. Botham, Mr. and Mrs. Elwood C. Brown, Mrs. Wm. H. Burnett, Mrs. John E. Z. Caner, Mrs. F. W. Creighton, Mrs. Louis L. Cunningham, Mrs. Roger Dane, Mrs. John T. Dawson, Mrs. Wm. L. Dickinson, Mrs. C. D. Edmundson, Mrs. James J. Everly, Mrs. A. R. Fairservice, Mrs. Jack Fidler, Mrs. Robert Flanagan, Mrs. E. M. Foisie, Dr. and Mrs. Arthur W. Freidinger, Mrs. Herbert H. Frost, Mrs. C. M. Hanley, Mrs. E. J. Havist, Mrs. Lucius D. Hill, III, L. V. Hitchman, Mrs. C. L. Hoff, Mrs. Hugh H. Hutcheson, Mrs. G. P. Hutchison, Mrs. Bruce McKim, Mrs. J. A. Papke, Mrs. Walter M. Phelps, Mrs. Ralph W. Redding, Mrs. John H. Schultz, Mrs. Casey Sepanski, Mrs. Wm. R. Shantry, Mrs. Jack Smith, Mrs. G. W. Smyth, Mrs. Wm. L. Sneltjes, Mrs. S. D. Stearns, Mrs. Conrad H. Topp, Miss Margaret West, Mrs. Barnett Whittlesey, Mrs. W. E. Williams, Mrs. Philip Wolgemuth, Mrs. Franklin R. Wright, Jr., Mr. and Mrs. John L. Wright, Mrs. Thomas P. Youell, Mrs. Robert A. Young.

We are also most grateful to the following members who have raised their dues to: *Supporting*—Mrs. Allen B. Engle. *Contributing*—Mrs. Arthur P. Redman. *Sustaining*—H. W. Albrecht, Mrs. Cyrus E. Braden, Mrs. R. A. Glaser, Mr. and Mrs. Paul N. Howard, Mrs. Robert D. Read.

ARBORETUM NOTEBOOK

This section is particularly designed for notes, information and queries concerning beautiful or unusual plants from growers of all types or experience. We solicit your remarks and ideas, but space limitations may sometimes restrict us to publishing those of the widest interest.

IRIS FOETIDISSIMA

IRIS FOETIDISSIMA does not merit its harshly unfavorable name. The leaves, when crushed, are supposed to emit an offending odor which was scarcely distinguishable to me.

The flower is an inconspicuous, faded blue but in the fall the unusual and attractively shaped pods open and show a mass of orange-scarlet berries which remain beautiful for a long period and are exceptionally valuable for winter decorations.

It is found growing wild in southern England and Wales as well as southern Europe and North Africa. The English call it the Stinking Gladdon and, strange as it may seem, "the roast-beef plant." It is said to be "abundantly self-fertilizing but unwilling to hybridize with others of the same family."

Chalky soils are suggested but mine did well in thick, woodsy soil with the inevitable light cover of fir needles. It grew in patches along the cool, damp, shadowy fern path, an utterly but interestingly different plant growth among the ferns.

It is not showy enough, I think, for the usual flower garden, but for the wild flower garden the sparkling and unusual color of the seeds adds a distinct interest at a season when vivid colors are rare. It will take care of itself for many years which is a certain comfort to any gardener.

G.T.D.

EUONYMUS, the Spindle-Tree

I FIRST saw the "Spindle-Tree" years ago in the little park at Tenth and Roanoke Streets, in Seattle. It was fall and I was fascinated with the brilliant, pendulous fruits—drooping clusters of crimson "arils" surrounding orange berries. Because of its unusual grouping of berries and its striking color the French call it "priest's cap."

I watched for it in gardens but found no one who knew its name. The next spring the flowers were so inconspicuous it was hard to believe it was the same shrub I had admired the autumn before.

One September the city workmen were cleaning around the shrubbery in the park, throwing many seedlings on the sidewalk. With a gardener's instinct I saw my opportunity. I was sure many of the discards were young seedlings of the bushes that had the beautiful fruits. The men did not want them and I gathered them together and planted them in my country garden on Bainbridge Island at the edge of the woodland.

In a very few years there was a fine border of spindle-trees. The pale green leaves made a distinct contrast to the native evergreens and its open growth gave a desirable brightness to the woods.

I finally learned that this was a member of the *Celastraceae,* the Staff-tree family which includes more than one hundred species in the North Temperate zone. This particular species, named *Euonymus europaeus,* sometimes called *Evonymus,* is a native of the British Isles and most of Europe, as far north as Sweden, and into western Asia.

One year the Royal Horticultural Society gave it an Award of Merit for being a "beautiful, fruit-bearing shrub." W. J. Bean, in his "Trees Hardy in the British Isles" says; "There is nothing more beautiful or striking in autumn than a fine spindle-tree well laden with fruit." John Grant, in his book "Trees and Shrubs for Pacific Northwest Gardens," calls the evergreen varieties very valuable garden plants.

In olden times the hard wood was used by the weavers for spindles.

There are many varieties. Mr. Witt says they grow between twenty and thirty different kinds in the Arboretum. Some have leaves

with fine fall coloring, some have evergreen foliage, a few are columnar in shape, others are more or less trailing and love to be trained against a wall or fence. One *Euonymus* has leaves a purplish-plum color; also there are many of relatively small importance. There is one that grows in shady, moist spots on the east side of the Cascade mountains, from southern Washington to California, called *E. occidentalis,* the western Wahoo. It has reddish-purple fruits.

Mine generously seeded themselves under the bushes and now, I am sure, many Bainbridge Island gardens have spindle-trees showing their whimsically quaint berries each fall.

They should be planted where the autumn sun will shine on the berries. The berries seem more prolific when the bush is growing in rather poor soil.

G.T.D.

From Our Correspondents

Mr. Donald G. Graham
1900 Shenandoah Drive
Seattle 2, Washington

Dear Mr. Graham:

It was with special interest that I read the account of the blooming of your *Magnolia Sargentiana* var. *robusta* in the recent issue of the University of Washington *Arboretum Bulletin,* Summer 1961. It was however, a great disappointment that a color description was not given. You stated that you believed yours to be the first tree of the species to bloom in the Pacific Northwest and, not to be outdone, we felt the same about ours, not knowing anyone else was growing it outside the Portland area.

Our tree is about 12′ to 15′ tall with a spread of about 8′, and like you we have pruned to a tree-like form, but with two standards. It was purchased as a 24″ whip from a nursery in San Francisco in 1951 along with a similar sized plant of *M. Campbellii.* Both were clones from the trees in the Strybing Arboretum, Golden Gate Park. The *M. Campbellii* was killed in the '55 freeze but the *M. Sargentiana* var. *robusta* growing only six feet away and totally unprotected was unharmed. The following year it was moved to its present location. Last year, 1960, it set six buds which were lost in a late freeze. This spring it set 16 buds and began flowering about the 20th of February and continued until the second week of March, all this time during driving rain storms, hail and violent winds. The weather was so turbulent that at no time could a picture be taken of the magnificent flowers; however here are its vital statistics. Individual petals, 5-6 inches long, making the entire flower 11-12 inches across. Color, using the RHS color chart, Magnolia Purple, from 030/1 on the outside to 030/3 on the inside of the petals. It ran the entire color gamut of Magnolia Purple. From a color picture in "Asiatic Magnolias in Cultivation," by G. H. Johnstone, it is identical to the Trewithen form. As for leaves, they are mostly rounded on the ends; however, those at the top of the tree are definitely emarginate.

On March 15th, the blooms of two other *M. Sargentiana* var. *robusta* were displayed at the Portland Chapter meeting of the ARS. One brought in by G. W. Charlton of West Linn, Ore., was a much lighter color to ours; however the overall size was the same, being 11 to 12 inches across. Its color was: outside petals, Mallow Purple 630-630/3; inside petals, Neyron Rose 623/3.

The other flower was displayed by Ernest Iufer of Salem. This was only 8-9 inches across, but a lovely thing. Its color: outside, Mallow Purple 630/1-630/3; inside petals, Rose Pink 426/3.

Having checked the above three flowers with the RHS Color Chart there is considerable difference so it would be interesting to know whether you identified the color of your bloom other than a pale mauve pink? Next spring it would be exciting if we could get a display of bloom from these known trees and really compare them. By that time,

Dr. Corbin's tree should be blooming which will give us four in this Portland area. The three blooming trees now are all different and how they compare with yours will always be a question without a good color description or unless we can see each other's tree.

Best wishes to you.

Sincerely yours,
RUTH M. HANSEN
Secretary-Treasurer
American Rhododendron Society
3514 N. Russet Street
Portland 17, Oregon

Arboreta and Gardens of N. W. Europe; Part 3

(Continued from Page 73)

plants of the *Holboellia* now growing in Seattle, though the other two failed to germinate this spring.

Like its sister institutions in Great Britain and all over Europe, this Botanic Garden is a fascinating place for anyone who grows or enjoys plants, not forgetting the orchid, fern and house plant lover, for these are to be seen here also in the conservatories and greenhouses. A day is only sufficient to skim the surface; one needs to return at other seasons to appreciate the extent of these rich collections, and this I shall certainly hope to do.

Whilst in Ireland I also spent a day visiting Birr Castle, Offaly, near the center of the country, belonging to Lord Rosse who was absent at the time, and saw three other smaller gardens near Dublin in the company of Lady Moore, all with interesting material of different kinds in them. In one of them, that of Mrs. Campbell, near Bray, Co. Wicklow, an ancient, humped specimen of the prostrate rosemary, 5 ft. high and 8 ft. across, by steps leading to the front door, was very remarkable, as was an example of the hybrid *Magnolia Thompsoniana,* perhaps of equal age, still flowering beside the house. Irish gardens are indeed rich in such surprises, and bear careful investigation.

Some of Our Favorites☆

☆Won't You Send Us Yours?

JAPANESE MAPLE

FOURTEEN years ago we selected a young Japanese Maple *(Acer palmatum)* for planting in a south-facing patio near full-length windows, hoping it would provide much needed shade and reduce glare. The choice was a good one. Not only has the tree served its utilitarian purposes well, but its grace and beauty have been a constant source of pleasure every season of the year.

Its green, star-shaped leaves, about two inches across, fan out parallel to the ground and give light, cool shade on hot summer days. The slightest breeze causes the paper-thin leaves to flutter. Many times we've glanced out the window to determine from the leaf action of the maple just which direction the wind was blowing!

In the fall, it is one of the last trees in our garden to color, possibly because of a good summer water supply. First a faint bronzing of exposed leaves, then a sudden turning to a glowing pyre of yellow, orange and red. In a week of gusty winds, the tree stands clean of leaves, revealing its graceful, strong, branching pattern. Somehow it's always a relief to see the last leaves drop, as the tree once again enters its familiar bare-leafed phase of beauty.

The smooth-barked main branches and trunk turn lime green in the rain, with the up-turning twigs a deep red. After a sudden shower, sparkling raindrops hang like tiny Christmas lights to each curving twig.

In early spring little nubs of dark red buds sprout on the twigs, swelling with each day of mild weather. On the same lower branch each year, the first wispy leaves open fan-wise, and shaded bronzy red rather than green. As all the leaves commence to unfold (with such speed that the tree has a different appearance daily), then the tree is, to us, the most beautiful of all. Pots of creamy daffodils

and primroses often flower in mid-April beneath the maple, contrasting well with the burnished cloud overhead. A permanent planting of Rhododendron 'Blue Tit', next to the maple, flowers just when the leaves have reached full size and have turned a delicate light green.

By May the growing branches are heavy with leaves that catch the rain, drooping so after a downpour that they must be shaken free. A little thinning is done at this time to prevent limb cracking. In July more thinning is done, and in late November the tree is pruned to improve the line and balance of branches. Now twenty years old, the maple has been allowed to grow about sixteen feet tall and fourteen feet wide.

LYN DAVIS

HYDRANGEA SERRATA 'GRAYSWOOD'

When walking through a beautiful garden, at different seasons, I feel I must have every plant I see, but for beauty and easy care I know of nothing more satisfactory than hydrangeas. There are so many of them, both hybrids and species, that everyone should be able to find more than one to his liking. One of which I am particularly fond is *H. serrata* 'Grayswood'.

To the best of my knowledge the first specimens of hydrangeas to be imported to Europe were dried flowers sent by Thunberg from Japan to the Herbarium at Uppsala in 1775. He, thinking they were viburnums, called them *V. macrophyllum* and *V. serratum*.

H. serrata 'Grayswood' is quite a tall, graceful bush, reaching to a height of about five feet, possibly more in shade. It has slender branches, and the corymbs, which are flat, are produced on new wood, often on branching terminals. The leaves are narrow, pointed and a pretty dark green, delicately veined. The flower head itself is not as large or showy as some of the lacecap macrophyllas. The flowers, although fairly numerous, are not very large, and the fertile flowers are small, urn-shaped and blue, turning brown with age or too much sun. However, if less dramatic, its beauty lies in grace, distinction and the coloring of the flowers. They first appear in June or early July, white with a bluish cast, turn pink or green, and as the summer progresses and the flowers age, dark red, and so they stay till frost, even after the leaves have begun to fall. One of my bushes which is in quite a shaded position has flowers of four different colors at one time. Another, in a more exposed, sunny place, which is a great mistake, I think, has mostly dark red flowers and brown fertile ones. Of course, this summer was unusual, and on some of the warmest days it wilted, even when heavily watered. I finally put a canopy of wet sheets over the poor, exposed plant, and my husband thought it was I who was suffering from the heat.

As a rule, hydrangeas turn blue or purple in acid soil, and pink or red in alkaline. *Serrata* 'Grayswood', however, never does this. So don't be fooled by its dark red color. It is a *lime hater,* so plant it with the rhododendrons and other *Ericaceae* in moist, dappled shade, and it will be the darling of your heart.

Please don't prune your hydrangeas. Let them grow as nature intended into graceful, arching shrubs, unless you are forced to by freezing weather such as we had in 1955. Leave their flower heads on until spring as in that way they retain the aluminum sulphate which they need for proper growth and color, particularly the blue ones. In the spring remove the flower heads and take the dead wood out to the ground. As a precaution, I wait until the branches begin to sprout. Often good wood, old growth, looks brown and dead. Heavy pruning in late fall will prevent some plants from blooming, or might kill a tender plant.

Unfortunately there are few available books in English on the culture of hydrangeas. E. H. Wilson wrote "The Hortensias,"* and of course you will find much that is interesting and instructive in Rehder's "Manual of Cultivated Trees and Shrubs" (1940), and in

*In "Jour. Arnold Arb.", IV, 233-246. (1923).

Bailey's "Standard Cyclopedia of Horticulture." The first two, however, may not be readily obtainable. The latest monograph on the genus is that by Dr. Elizabeth McClintock in "Proc. Calif. Acad. Sci.", XXIX, No. 5, (Nov. 1957). MRS. KENELM WINSLOW

Why Leaves Change Color in Autumn

(Continued from Page 80)

cyanin to develop from the "excess" sugar in the leaves.

3. *Temperature*

The effect of temperature is probably related to the level of sugar described in the previous paragraph. That is, cooler temperatures favor higher sugar contents of the leaves and greater development of the pigments. Hard frosts, however, may damage the leaves and cause a reduction in the amount of color produced.

4. *Light*

High light intensities favor the formation of anthocyanin pigments, so clear, bright weather is necessary for the development of the best autumn coloration.

5. *Mineral nutrition*

Excessive amounts of nitrogen in the soil may reduce the amount of pigment development in leaves, as the sugars which would otherwise go into pigment formation may be combined with nitrogen to form proteins.

Deficiencies of nitrogen, phosphorus, and magnesium often cause the development of reddish anthocyanin pigmentation. Plants which show premature coloration, especially in the lower leaves, may be suffering from one of these deficiencies. On the other hand, adequate potassium should favor development of color, because of its stimulating effect of sugar formation, but no data on this point is available. The acidity of the soil probably has no effect on coloration.

6. *Water supply*

Some confusion and difference of opinion exists with respect to the effects of water. On the one hand, drought may cause premature coloration of foliage, but may also cause premature death and dropping of the leaves. Thus it appears that bright, clear weather coupled with a reasonable amount of rainfall which will keep plants and leaves in good condition produce the most favorable autumn coloration. Deficiency of water probably exercises its effect in increasing coloration because of the tendency for insoluble carbohydrates to be converted into sugars under drought conditions.

7. *Disease*

Diseased trees or isolated branches of trees often develop premature and strong leaf coloration. This is probably associated either with interruption of the movement of sugars from the foliage to other parts of the plant, or with a reduction in mineral or water absorption caused by damage to the root system or the conducting system.

Probably the senescent leaves which have developed yellow, orange, or reddish colors no longer serve a useful function to the plant, but neither do they harm the plant nor use up very much of its food reserves. The left-over and by-product pigments of leaves play a prominent role, however, in our enjoyment of many plants during the autumn.

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Fall Color In Eastern Washington

(Continued from Page 81)

will stand some shade.

Spreading Cotoneaster, *Cotoneaster divaricata,* provides an excellent display of red fruit in addition to the small red leaves. Its spreading, mounded growth makes it more useful as a specimen.

Winged Euonymus, *Euonymus alatus,* often colors to a bright pinkish red that causes much comment. An interesting specimen shrub to 12 feet. For more limited space, the dwarf form may be used. Corky ridges on the twigs add winter interest.

Arrowwood Viburnum, *Viburnum dentatum,* has attractive toothed leaves which turn

red shades in the fall. An effective border plant or filler to 8 feet. Alpine currant, *Ribes alpinum,* a good facer shrub which will tolerate shade. Foliage turns a reddish color. Low growing, to 4 feet.

Froebel spirea, *Spiraea Bumalda Froebelii,* foliage turns orange to orange-red. Interesting for its late summer bloom of deep rose flowers. Grows to about 4 feet. Other spireas to color include Thunberg spirea, *S. Thunbergii,* and Bridalwreath, *S. prunifolia,* larger shrubs for the border.

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9:00 A.M.

Thursday, Oct. 5, 1961

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BOOK REVIEWS

Sunset's *Western Garden Book,* rev. edn. (Lane Book Co., Menlo Park, Calif., 1961) Price $3.95.

THIS new edition of an old favorite has been revised to bring it up to date with modern gardening practices, new varieties, new chemicals. As you might expect, the major revisions have been made in the information relating to the use of new insecticides, fertilizers and weed killers. The chapter on lawns deals with the subject from seed to weeds and pests with such thoroughness that it may well convert many to the use of ground covers.

There have also been many changes in the plant descriptions; the botanist may not find these adequate but the plain dirt gardener will find them valuable, especially the suggestions for plant groupings and positions.

This is a quick, easy reference book with a wealth of sound gardening know-how that is useful to both the beginner and the advanced amateur. It is illustrated with good line drawings that do much to clarify the text.

The climate zone maps are especially fine, giving a more precise definition of the various zones than we have had before. This specific knowledge of the climatic conditions of the zones in which we live should enable us to estimate the probable hardiness of our plants with greater success.

MRS. ESTHER BERRY

Garden Shrubs and Trees, by S. G. Harrison. (St. Martin's Press, New York, 1960) Price $4.95.

THIS fine little book is an excellent introduction to plant science designed for those who may be beginners: a real find for those of us who got our botany from the nurseryman's catalog. It is beautifully illustrated with fifteen color plates as well as twenty-three black and white sketches to help you make the transition easily.

The contents are arranged according to the generally accepted principles of systematic botany. Each plant is listed with its family and given the scientific name and author as well as the popular one, if there is one. The descriptions are both concise and comprehensive, containing much information relative to plant lore that the reader will enjoy. Scientific terms have been used where these are necessary for accuracy but these terms are so clearly explained in the introduction, the glossary or the text that it is easy for the novice to understand and in this way develop a working knowledge of the basic vocabulary for the classification and nomenclature of plants. It is of course impossible to include all the species and varieties that are in cultivation in this one small volume but certainly it is an excellent introduction to the subject, with a full index to those mentioned.

"Garden Trees and Shrubs" is one of the Kew series, edited and written by members of the botanical staff of the Royal Botanic Gardens, Kew. This is a five volume series planned to be a systematic guide to our native, naturalized and cultivated plants.

MRS. ESTHER BERRY

Rhododendrons For Your Garden, American Rhododendron Society, Portland, Oregon (1961). Price $6.95.

THIS book covers a wider geographical range than previous publications and for a national organization this undoubtedly will extend its usefulness. A reviewer unfamiliar with growing conditions in other areas cannot evaluate the merit of these contributions but it is basic that people with experience in their own region would be far better guides than the specialists in our area or England. The writer, having made a number of visits to the gardens of the East Coast such as those of Mr. Dexter, Mr. du Pont, the Arnold Arboretum and others, always realized that in our talks the terms we were using had different meanings for each of us. This is true to a large degree even in our own Northwest, as instance the term "full sun" which varies with each locale, sometimes even with the position in a garden.

It is suggested therefore that each reader try to follow the advice of experienced growers in his own locality. Except of course the experimenter who loves a challenge, but such experimental work often retards the beauty of a garden and can prove expensive.

This book contains an abundance of useful information with guide lines drawn by capable, dedicated growers who have pooled their experience and judgment for your benefit.

The specialist in our area may consider much of the subject matter "old hat," but should realize that such a summation of information is primarily for the average gardener who has not had the time or the experience that older growers have given the subject. Again the same specialists seldom agree on the merits of individual plants, for their tastes vary as well as the growing conditions in their gardens.

The hardiness ratings are the best that have been published and the ratings of truss value separate from the plant value is a splendid guide. Time of flowering is also of help in planning display sequence. It should be remembered however that the symbols used are general and can vary considerably in many gardens. For instance, the writer had a 'Rosamundi' in an eastern exposure that flowered about six weeks earlier than one in partial shade. Anyone who has grown rhododendrons is familiar with such variations but this does not detract from the careful and conscientious work done by the publishing committee.

The editor, Dr. J. Harold Clarke, is also to be congratulated on giving space to the use of rhododendrons in flower arrangements. Why such beautiful material is so generally neglected is hard to understand, except on the grounds that it lacks precedent.

H. G. IHRIG

Search for the Chinquapin in the State of Washington

(Continued from Page 88)

and will not be too large for a home or farmstead planting. It is an evergreen and might

at first sight be mistaken for a holly, except that the underside of the leaves is tinged with a shade of pale saffron. The tree, or shrub as it will appear in the Puget Sound country, may be propagated by growing nursery stock from the planted nuts or by a layering process from lower branches of the trees which rest upon the ground. In other words, the Chinquapin shrub can be handled by the layering process in the same manner that growers propagate the holly. If the Chinquapin plantings are to be propagated by using the nuts for nursery stock, it probably would be best to use seed locally procured rather than nuts obtained from dealers further south. Home grown seeds should produce stock like the local source of production.

How Green Is Our Greenhouse?

(Continued from Page 83)

The past winter, our second of operation, had us sailing along quite confidently until we were presented with an exorbitant bill for our electric heating during the cold months. We conquered this problem by lining the greenhouse with a layer of plastic material, leaving a dead air space for insulation between glass and plastic.

It is hard to describe the spirit of camaraderie that existed among the volunteers in the greenhouse. The work was hard, much of it heavy physical work, but the attitude of everyone was such that it was just plain fun. We inserted our cuttings and potted up our baby plants, all the while carrying on conversations ranging through such diverse subjects as children, politics and diets. An effort was made to use as many different volunteers as possible because it enabled more people to learn propagating techniques. It also furthered interest in the Arboretum and its activities.

A vast variety of plant material has been processed through the greenhouse and has become familiar to the volunteers. We have propagated many new and unusual things, among them *Actinidia chinensis, Corylopsis pauciflora, Hypericum patulum* 'Hidcote', *Loropetalum chinense, Ceanothus impressus* 'Puget Blue', *Camellia* 'Donation' and *Sciadopitys verticillata* as well as many species of rhododendrons and other more familiar plants. The plant material which we used for cuttings came from many sources. Quite a number were from the Arboretum plants, others came from favorite plants in members' gardens. A special attempt was made to take cuttings from plants of unusually good form or type. A total of 3,520 cuttings have been inserted during the year ending May, 1961.

One of the greenhouse assistants, Mrs. David Metheny, assisted by Mr. Lawrence Michaud, searched through many excellent books and prepared a booklet entitled "Cuttings Through the Year." This booklet listed plant materials according to the month when they were most likely to root. We found it an excellent aid to us in the greenhouse. It was printed in quantity and is for sale in the Arboretum office. Price $1.00.

We are much indebted to a long-suffering Arboretum staff. Their greenhouse crew, watching our desperate efforts to make our greenhouse project succeed, taught us much about techniques. They cleaned mist nozzles, repaired a balky ventilator fan, sprayed the outside of the greenhouse to reduce light intensity, and did many other things beyond our knowledge or strength.

Through the combined efforts of the many people who participated, our *Greenhouse Is Green* and we are all vastly proud of it.

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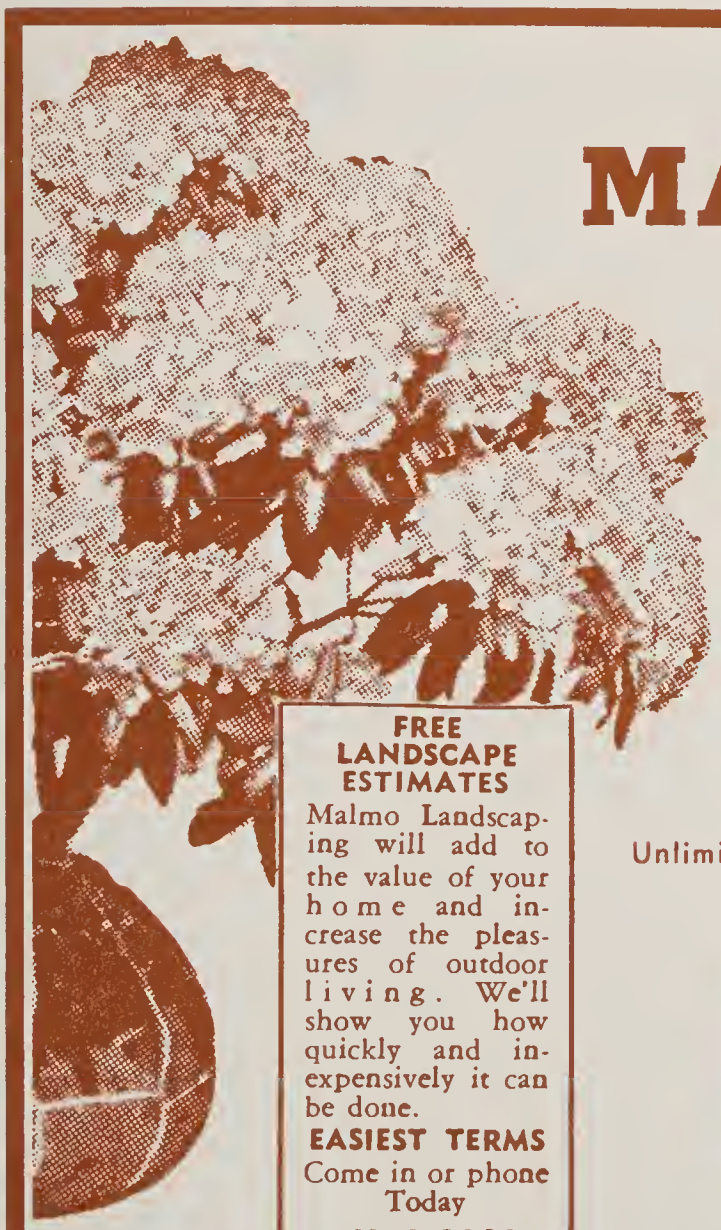

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